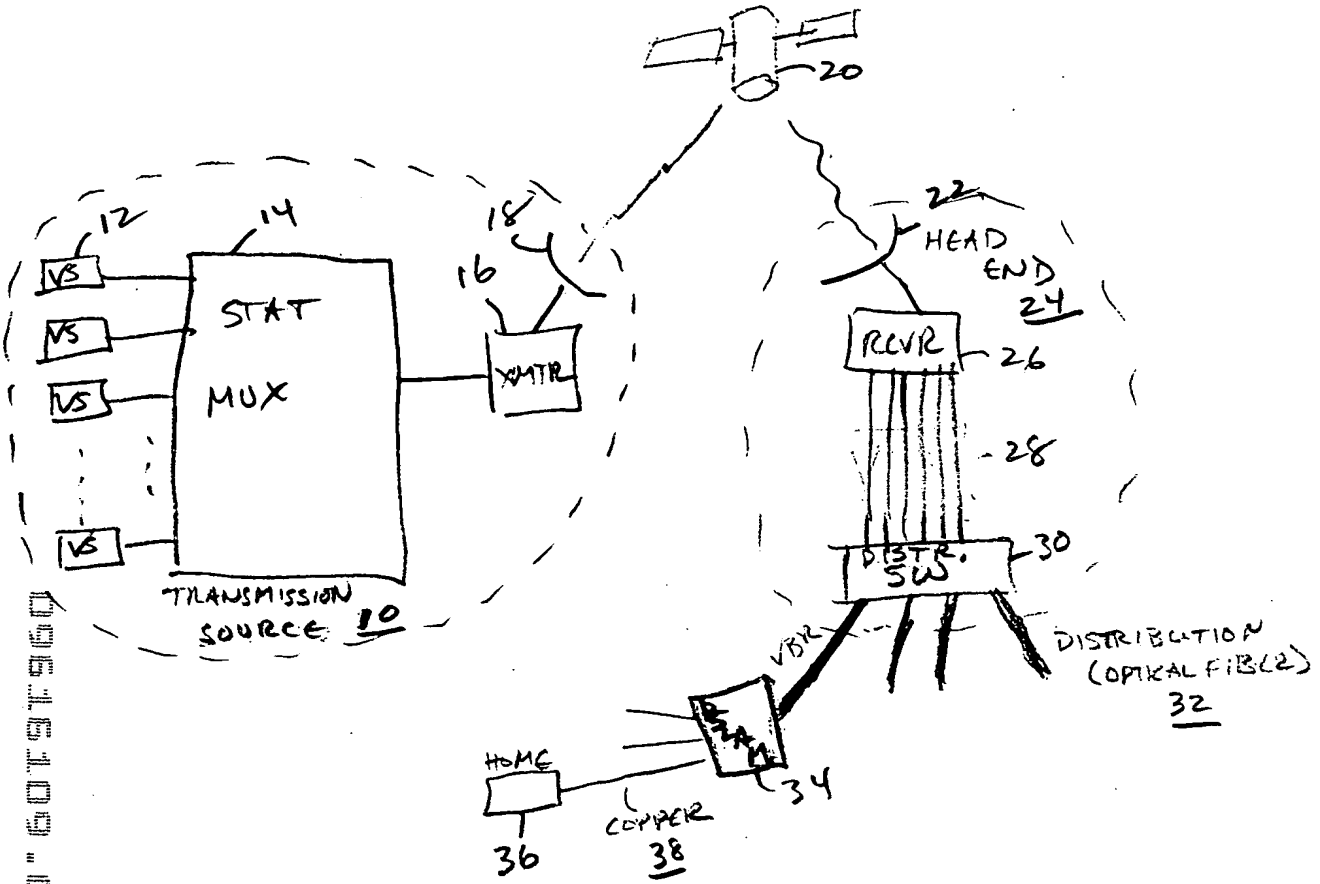

20
22
HEAD END
24
12
14
18
16
VS
VS
VS
VS
STAT MUX
XMTR
RCVR
26
28
DISTR. SW
30
TRANSMISSION SOURCE 10
VDSL
DISTRIBUTION (OPTICAL FIBER)
32
DSLAM
34
HOME
36
COPPER
38

FIG. 2

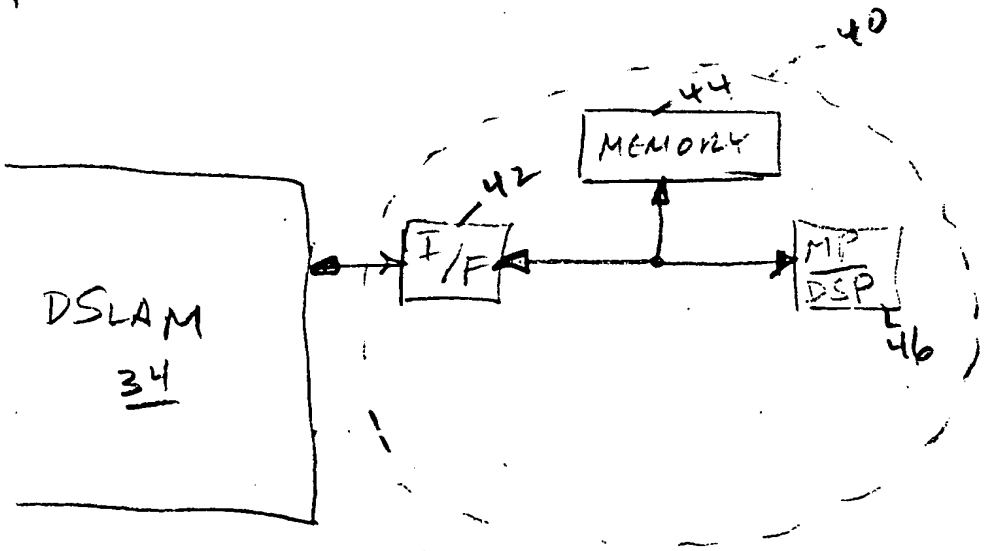

40
44
MEMORY
42
I/F
MP DSP
46
DSLAM
34

FIG. 3

00hE20" 60T9T960

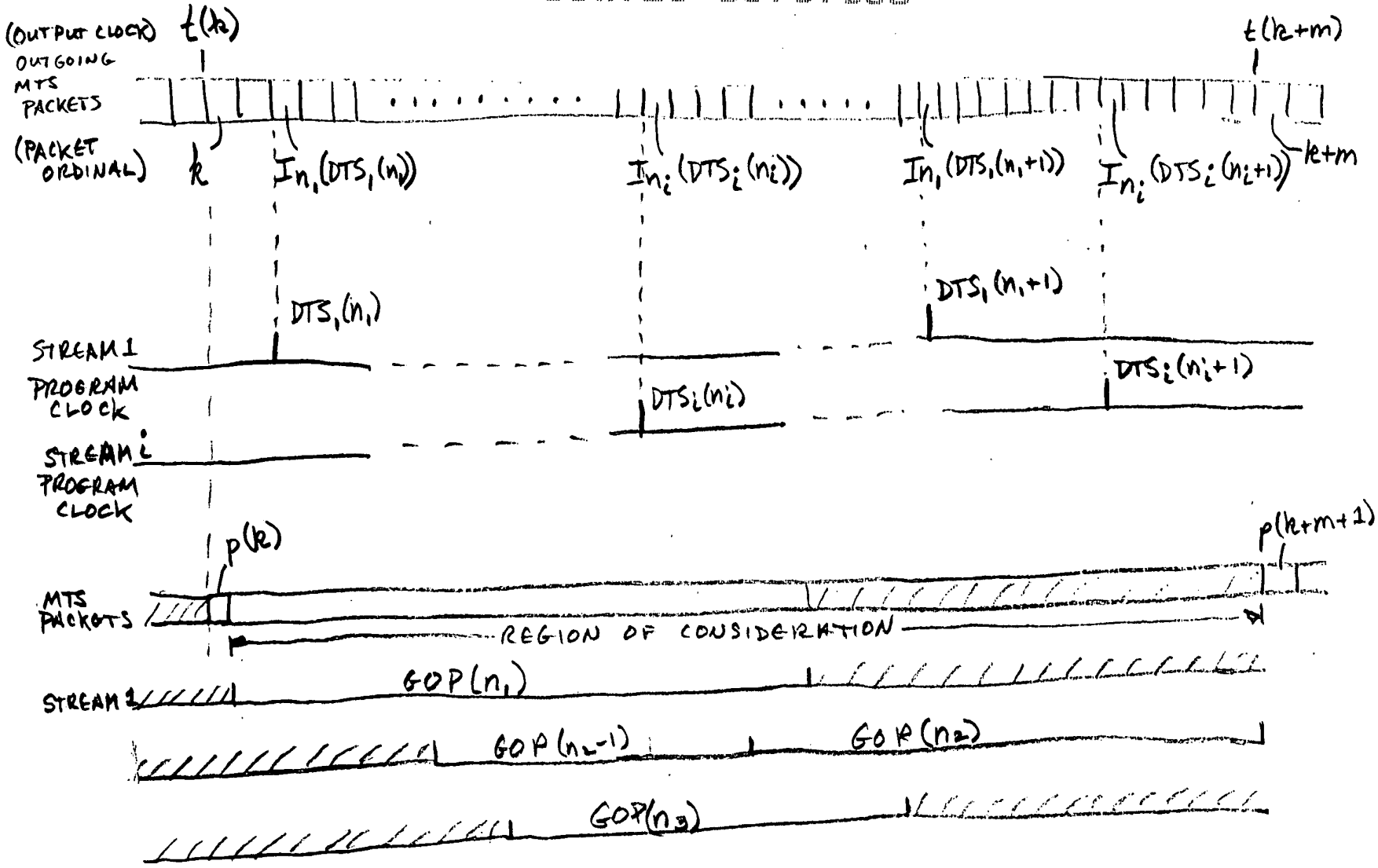


FIG. 2

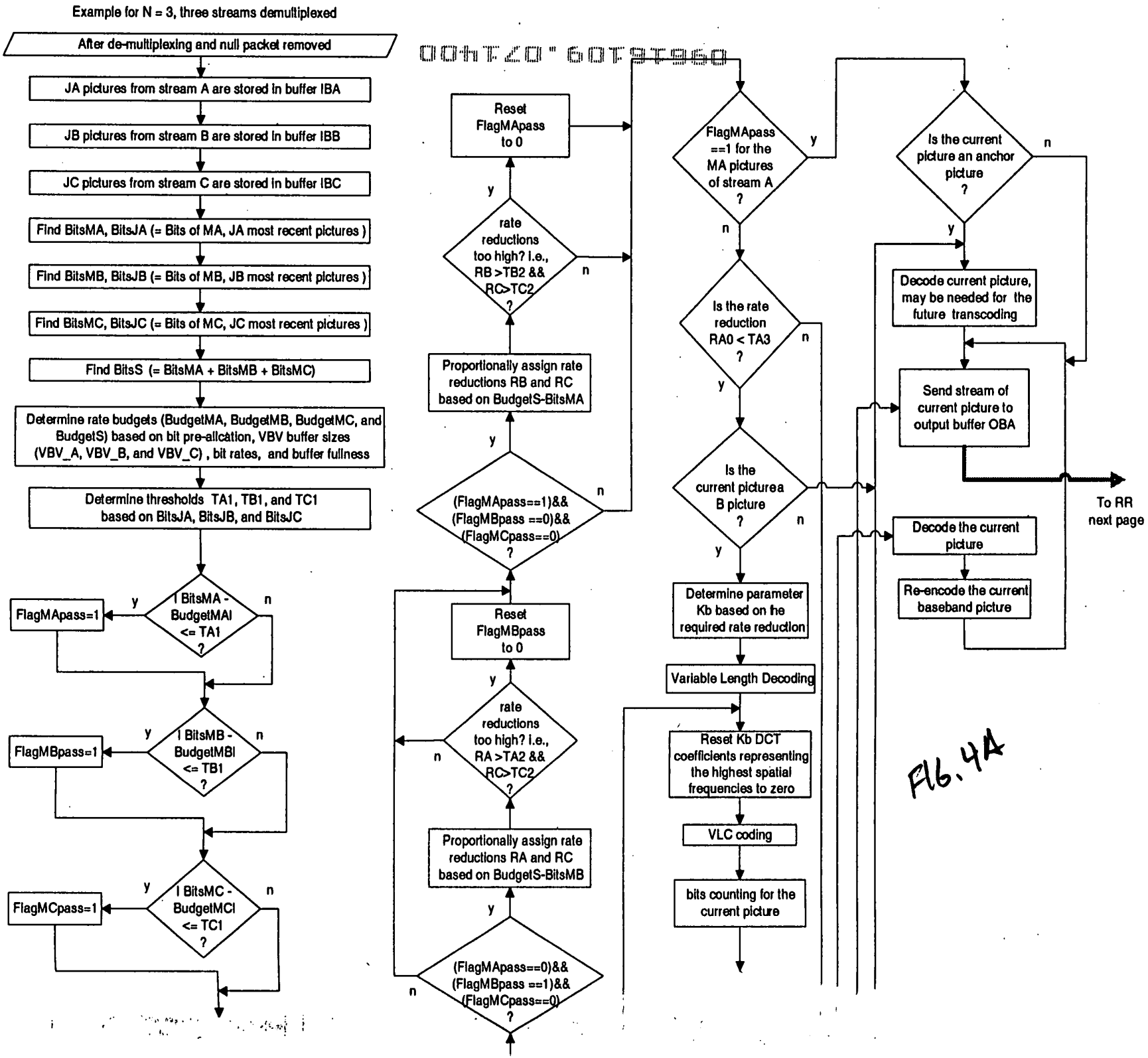

Example for N = 3, three streams demultiplexed
After de-multiplexing and null packet removed
JA pictures from stream A are stored in buffer IBA
JB pictures from stream B are stored in buffer IBB
JC pictures from stream C are stored in buffer IBC
Find BitsMA, BitsJA (= Bits of MA, JA most recent pictures)
Find BitsMB, BitsJB (= Bits of MB, JB most recent pictures)
Find BitsMC, BitsJC (= Bits of MC, JC most recent pictures)
Find BitsS (= BitsMA + BitsMB + BitsMC)
Determine rate budgets (BudgetMA, BudgetMB, BudgetMC, and BudgetS) based on bit pre-allcation, VBV buffer sizes (VBV_A, VBV_B, and VBV_C) , bit rates, and buffer fullness
Determine thresholds TA1, TB1, and TC1 based on BitsJA, BitsJB, and BitsJC
| BitsMA - BudgetMAI <= TA1 ?
y
n
FlagMApass=1
| BitsMB - BudgetMBI <= TB1 ?
y
n
FlagMBpass=1
| BitsMC - BudgetMCI <= TC1 ?
y
n
FlagMCpass=1
Reset FlagMApass to 0
rate reductions too high? I.e., RB >TB2 && RC>TC2 ?
Proportionally assign rate reductions RB and RC based on BudgetS-BitsMA
(FlagMApass==1)&& (FlagMBpass ==0)&& (FlagMCpass==0) ?
Reset FlagMBpass to 0
rate reductions too high? I.e., RA >TA2 && RC>TC2 ?
Proportionally assign rate reductions RA and RC based on BudgetS-BitsMB
(FlagMApass==0)&& (FlagMBpass ==1)&& (FlagMCpass==0) ?
FlagMApass ==1 for the MA pictures of stream A ?
Is the rate reduction RA0 < TA3 ?
Is the current picturea B picture ?
Determine parameter Kb based on he required rate reduction
Variable Length Decoding
Reset Kb DCT coefficients representing the highest spatial frequencies to zero
VLC coding
bits counting for the current picture
Is the current picture an anchor picture ?
Decode current picture, may be needed for the future transcoding
Send stream of current picture to output buffer OBA
Decode the current picture
Re-encode the current baseband picture
To RR next page

Fig. 4A

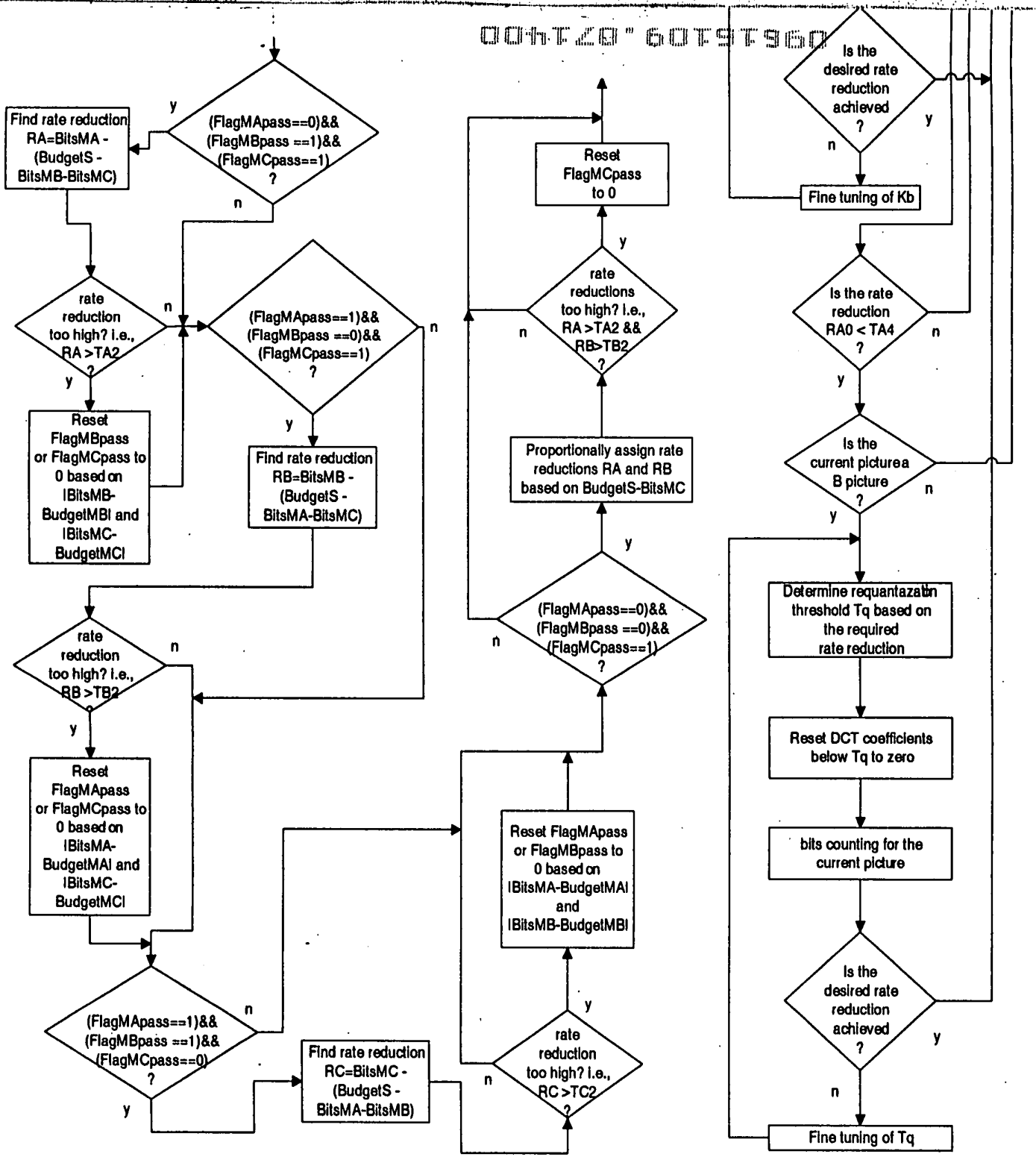

(FlagMApass==0)&& (FlagMBpass ==1)&& (FlagMCpass==1) ?
y
n
Find rate reduction RA=BitsMA - (BudgetS - BitsMB-BitsMC)
rate reduction too high? i.e., RA >TA2 ?
n
y
Reset FlagMBpass or FlagMCpass to 0 based on |BitsMB-BudgetMBI and |BitsMC-BudgetMCI
(FlagMApass==1)&& (FlagMBpass ==0)&& (FlagMCpass==1) ?
n
y
Find rate reduction RB=BitsMB - (BudgetS - BitsMA-BitsMC)
rate reduction too high? i.e., RB >TB2
n
y
Reset FlagMApass or FlagMCpass to 0 based on |BitsMA-BudgetMAI and |BitsMC-BudgetMCI
(FlagMApass==1)&& (FlagMBpass ==1)&& (FlagMCpass==0) ?
n
y
Find rate reduction RC=BitsMC - (BudgetS - BitsMA-BitsMB)
rate reduction too high? i.e., RC >TC2 ?
n
y
Reset FlagMApass or FlagMBpass to 0 based on |BitsMA-BudgetMAI and |BitsMB-BudgetMBI
(FlagMApass==0)&& (FlagMBpass ==0)&& (FlagMCpass==1) ?
n
y
Proportionally assign rate reductions RA and RB based on BudgetS-BitsMC
rate reductions too high? I.e., RA >TA2 && RB>TB2 ?
n
y
Reset FlagMCpass to 0
Is the desired rate reduction achieved ?
y
n
Fine tuning of Kb
Is the rate reduction RA0 < TA4 ?
n
y
Is the current picturea B picture ?
n
y
Determine requantazatin threshold Tq based on the required rate reduction
Reset DCT coefficients below Tq to zero
bits counting for the current picture
Is the desired rate reduction achieved ?
y
n
Fine tuning of Tq

FIG. 4B

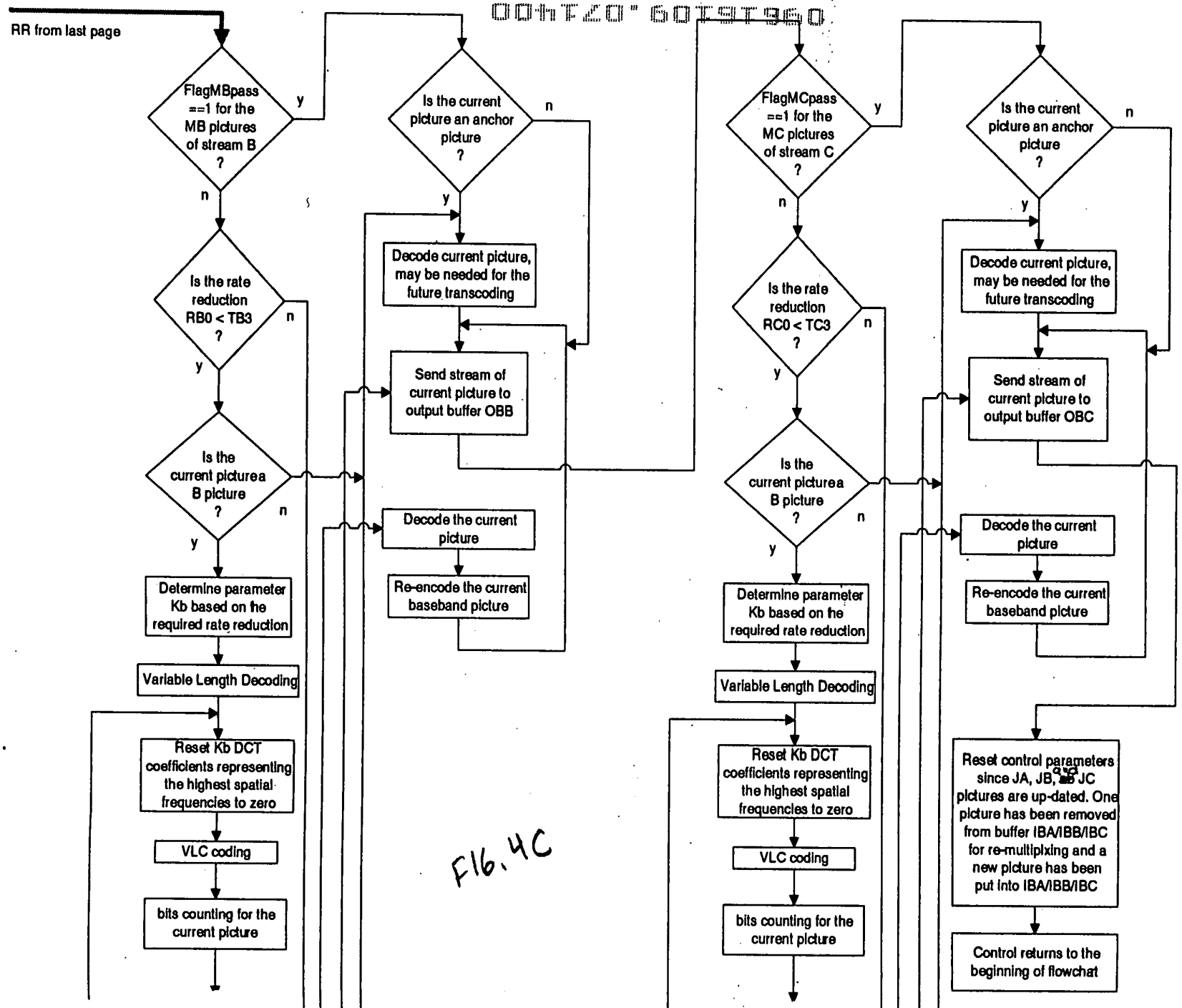
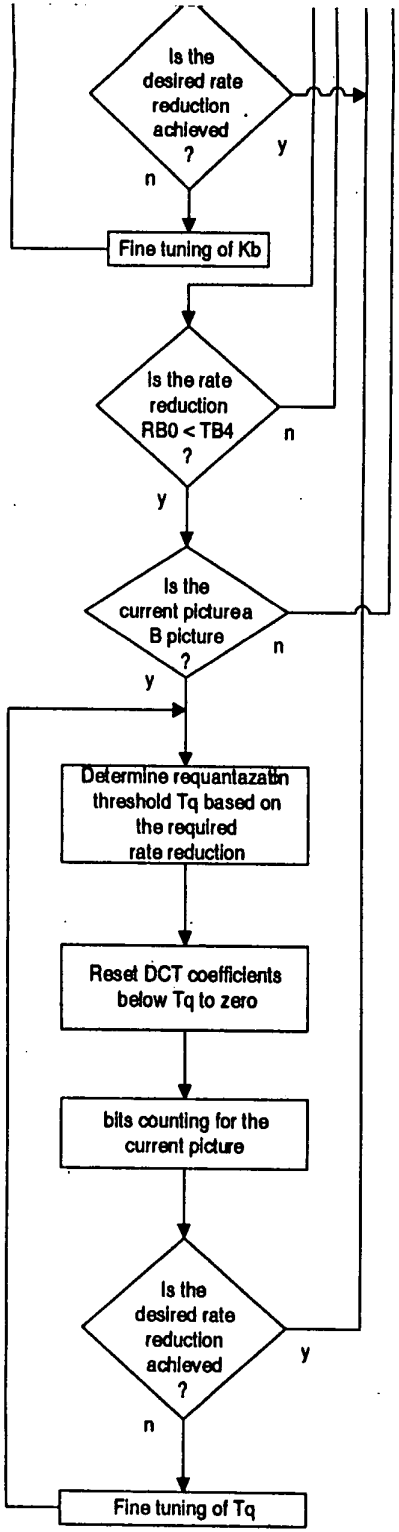
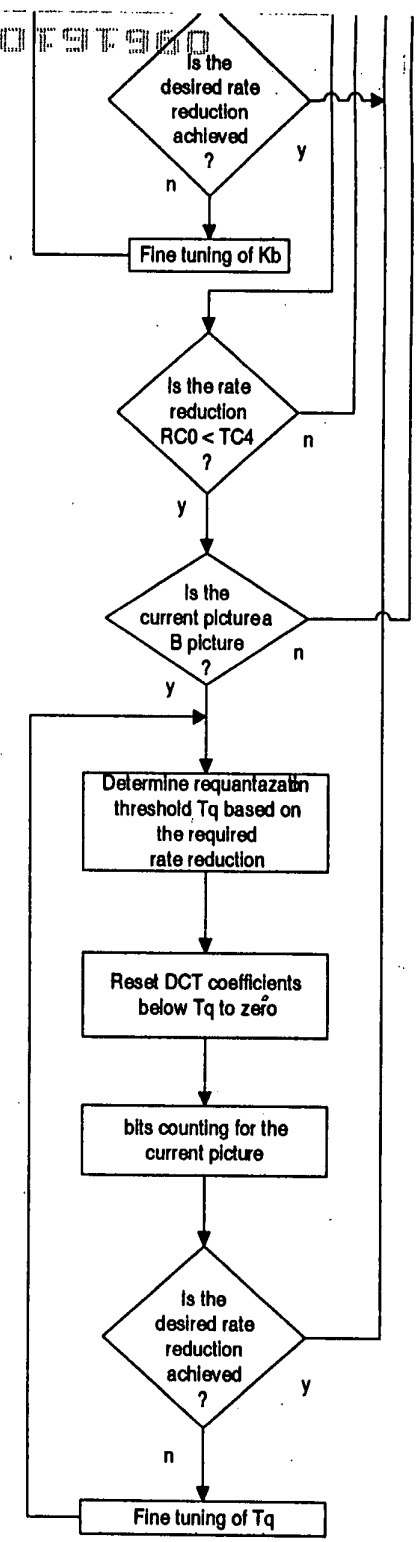
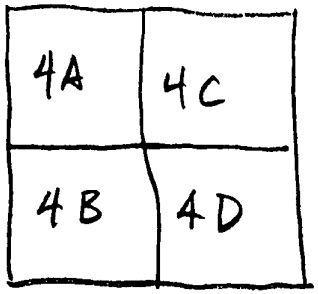

RR from last page
FlagMBpass ==1 for the MB pictures of stream B ?
y
n
Is the rate reduction RB0 < TB3 ?
y
n
Is the current picturea B picture ?
y
n
Determine parameter Kb based on the required rate reduction
Variable Length Decoding
Reset Kb DCT coefficients representing the highest spatial frequencies to zero
VLC coding
bits counting for the current picture
Is the current picture an anchor picture ?
y
n
Decode current picture, may be needed for the future transcoding
Send stream of current picture to output buffer OBB
Decode the current picture
Re-encode the current baseband picture
FlagMCpass ==1 for the MC pictures of stream C ?
y
n
Is the rate reduction RC0 < TC3 ?
y
n
Is the current picturea B picture ?
y
n
Determine parameter Kb based on the required rate reduction
Variable Length Decoding
Reset Kb DCT coefficients representing the highest spatial frequencies to zero
VLC coding
bits counting for the current picture
Is the current picture an anchor picture ?
y
n
Decode current picture, may be needed for the future transcoding
Send stream of current picture to output buffer OBC
Decode the current picture
Re-encode the current baseband picture
Reset control parameters since JA, JB, and JC pictures are up-dated. One picture has been removed from buffer IBA/IBB/IBC for re-multiplxing and a new picture has been put into IBA/IBB/IBC
Control returns to the beginning of flowchat

FIG. 4C

00HT20"60T9T960





F16.4D